1. Sodium Beacon Laser System for the Lick Observatory

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6. Abstract Text:

A laser system which will generate a bright sodium-layer guide star for the three meter Shane telescope at the Lick Observatory has been built and tested. The system consists of three frequency doubled YAG lasers fiber coupled to a chain of liquid dye lasers, a suite of optical diagnostics and a projection telescope. The laser generates >20 W of 589 nm pulses with duration of 100 ns, at a repetition rate of 10 KHz and with a near diffration limited beam quality. The laser oscillator is operated in a single longitudinal mode and frequency modulated to match the absorption spectrum of mesospheric sodium atoms. The optical diagnostics include a closed loop pointing and centering system, high speed tilt corrector, power meter and wavefront sensor. The projection telescope expands the beam to 20 cm and provides a retro reflection for wavefront sensing. The fiber coupling feature permits remote location of the laser oscillator and YAG pump lasers and greatly simplifies the problem of waste heat removal. Details of the telescope installation will be presented. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under contract W-7405-Eng-48.

7. Biography

Herbert Friedman received his Ph.D. from the Polytechnic Institute of Brooklyn in Electrophysics. He worked for Avco Everett Research Laboratory in the areas of high power laser and broad area electron beam systems. At the Lawrence Livermore National Laboratory, Dr. Friedman led the Copper Laser Group for the laser isotope separation program and is presently directing the program for laser guide stars.